
Retread Performance Study

Executive Summary

of Consultant's Report

**Prepared for North Carolina General Assembly Joint
Transportation Oversight Committee**

Presented By
Michael L. Bair and Thomas M. Dodson
Smithers Scientific Services Inc.
April 23, 2008

Smithers Scientific Services, Inc.



Task as Per the RFP

“The Joint Legislative Transportation Oversight Committee of the North Carolina General Assembly is seeking a consultant to conduct a comparative analysis of quality, safety and cost-effectiveness for the types of retread processes purchased through the State’s statewide contract.”



Agreed Upon Approach to Task

A performance-based approach to study

- ▶ Durability performance in the fleets
- ▶ Analysis of fleet performance satisfaction
- ▶ Analysis of cost-per mile and miles per 32nd inch tread wear
- ▶ Total value of NC State retread purchases
- ▶ Other states' practices
- ▶ Current State RFP specification analysis
- ▶ Tire size 11R22.5 only



Slide 3

MSOffice1 , 4/17/2008

MSOffice2 , 4/17/2008

Smithers' Background

Smithers Scientific Services, Inc.

- ▶ Established 1925 in Akron as an impartial testing resource for the tires & tire related products. Evolved into a multidiscipline, independent testing, research and consulting firm. Serves global clientele in the rubber and plastics industries and throughout the automotive supply chain.
- ▶ Part of the *Smithers Group of Companies*

www.smithersscientific.com

www.smithersgroup.com



Key Smithers Personnel

- ▶ Thomas M. Dodson
- ▶ Michael L. Bair



Consultant's Experience

Thomas M. Dodson

Vice President, Akron Operations

- ▶ Smithers for 24 years
- ▶ 33 years industry experience
- ▶ Expertise in tire design and tire testing
- ▶ Extensive experience in forensic tire analysis
- ▶ Well-known expert in litigation involving tire products, including retreaded tires
- ▶ Expertise in motor vehicles of all types



Consultant's Experience

Michael L. Bair

Senior Manager, Technical Consulting

- ▶ Smithers since 2005
- ▶ Michelin North America for 32+ years
- ▶ Extensive tire industry business and field expertise including fleet tire evaluation and retreading
- ▶ Industry technical expertise, including tire forensics
- ▶ Government regulatory expertise



North Carolina Resources

- ▶ Personal visits or discussions with approximately 49 individuals from:
Legislative Services, JLTOC, DPI, LEAs, NCDOT, Purchase & Contract, White's Tire & Rubber Company, Snider Tire Inc., Bandag Inc
- ▶ Field visits to 9 LEA fleets, plus DPI Transportation Services
- ▶ Field visits 7 NCDOT locations



Two-Pronged Methodology

Prong #1 - Field data. An analysis of tire/retread performance with the use of:

- Fleet and headquarters visits, including on-going discussions and correspondence
- Tires actually in service in the fleets
- Vehicle/Tire maintenance records
- On-vehicle tire inspections
- Survey of LEA locations for off-contract purchases



Two-Pronged Methodology

- ▶ **Prong # 2** - An objective laboratory and dynamic testing comparison of retread types
 - ➔ Laboratory benchmarking to compare physical/chemical and mechanical properties of certain components of contract-supplied and competitors' products.
 - ➔ Dynamic benchmarking to compare contract-supplied and competitors' products. Places mounted tires on laboratory testing equipment, at increasing levels of load and speed.



Retread Process Comparison

Mold-cure vs. Pre-cure

Pre-cure process

Rubber already cured – tread design already molded in. Curing of the bond layer required. Curing temp ~ 200° F. Bandag, White's pre-cure, others

Mold-cure process

Uncured rubber applied – tread design and markings applied during the curing process. Curing temp ~ 300° F. White's, Michelin MRT others

Both processes must bond uncured rubber to cured rubber



“Bead to Bead” Mold-cure

Mold-cure process as described, except:

- ▶ Sidewall markings are removed during the buffing process
- ▶ A thin veneer of uncured rubber is applied to the sidewall, and the curing mold is engraved with the replacement sidewall markings.
- ▶ Can have an esthetic benefit.
- ▶ Has been far more popular in Europe than in North America



Market Presence of Retread Processes for Medium Truck

- ▶ North America ~ 80-85% pre-cure
- ▶ North America ~ 15-20% mold-cure (bead to bead mold-cure % very small)
- ▶ Europe – bead to bead mold cure more prevalent than in NA (Michelin Remix and others)
- ▶ Developing markets – For new capacity, pre-cure is growing due to manufacturing flexibility and much less capital cost to set up a plant. Still a lot of mold-cure equipment in use



Main Determinants of Retread Performances

1. The history and condition of the casing (damage repairs, etc); maintenance history and type of service.
2. The retread plant doing the work; well-trained technicians, using a market-proven, controlled process.

Either type retread can perform well. In a competitive marketplace, this naturally can vary depending on the fleet vocation, etc.



Types of Repairs

- ▶ Spot repairs – repair cuts & cracks in rubber anywhere on tire; not extending through all reinforcement material
- ▶ Nail hole repairs – to repair limited-size punctures that extend to the air chamber
- ▶ Section repair – repairs an area of damage that requires part of the tire's reinforcement material to be replaced



CONCLUSIONS



Conclusions

- ▶ User satisfaction. No dissatisfaction was expressed or even implied, regardless of type of retread product.
- ▶ Maintenance and repair. No maintenance and repair issues on the part of the fleets; or outside providers of these services.
- ▶ Retread durability. Comparable durability performance, regardless of type/brand retread



Conclusions

Cost Per Mile Results

- ▶ Very consistent, across typical NCDOT and LEA fleets
- ▶ Most economical was White's Oliver pre-cure traction in NCDOT Div. 9 and 10 fleets. Average 0.35 cents per mile
- ▶ Bandag (BDV & BRM) pre-cure retreads were nearly identical at .050 cents per mile



Conclusions

Cost per mile results (cont.)

- ▶ White's bead to bead, in either NCDOT or LEA service, was 0.70 cents per mile – same as the GY Wingfoot pre-cure
- ▶ The cost-per-mile data were very consistent, reproducible and representative of the performance anticipated from quality retread products



Conclusions Laboratory Analysis and Testing.

- ▶ Comparable rubber formulations, overall similar peel force values.
- ▶ Comparable road-wheel dynamic performance using FMVSS 119 (stepped-up load) beyond new tire minimum performance requirements



Conclusions -Spot Repairs

- ▶ Our work showed average of 9 for NCDOT and 2.6 for LEAs.
- ▶ NC contract custom and practice appears to be to invoice 3 spot repairs (\$12.07 ea. for B to B and \$7.28 ea. for pre-cure)
- ▶ Therefore – no economic benefit for separate invoicing of spot repairs
- ▶ Industry custom and practice includes spot repairs in the price of the retread



Conclusions - Value of the Contract

\$2,657,577.20 – 2006 LEA on-contract

\$ 697,093.44 – 2006 NCDOT on-contract

\$ 716,261.90 – LEA-reported annual off-
contract purchases

\$4,070,932.54 – Value of NC State retread
purchases, contract and
off-contract



Conclusions – Retread Specification

Retread specification

- ▶ We recommend focusing specs on only those factors under the State's control, such as:
 - ➔ No. of retreads; max. casing age; number and type of nail hole repairs; acceptability of section repairs; minimum tread depths for a given application, etc.



Conclusions – Retread Specification (cont.)

- ▶ Retread vendor certification and initial product submission.
- ▶ Remove the very specific physical properties specification
- ▶ Let the vendor(s) formulate tread compounds to achieve a level of performance that is acceptable to the State's fleets



Conclusions – Multi-Award Purchasing

- ▶ Possible trend in other states, based upon Smithers' sample survey
- ▶ Can provide extensive “menu” of tire and retread products from proven suppliers, at government level pricing
- ▶ Allows fleet manager to select the best solution for an application – and therefore could result in lowest life-cycle cost (cost per mile)
- ▶ Can assure product availability and local service



Conclusions – Others States' Practices

- ▶ No other state specified bead to bead mold-cure
- ▶ Utah specified pre-cure (mold-cure on case-by-case approval basis)
- ▶ All others utilized some form of multi-award purchasing. Separate retread contracts only in come instances



Conclusions – Others States' Practices (cont.)

South Carolina

No state retread contract

SCDOT has its own contract (presently expired).
Has been with White's – bead to bead mold cure.
Going out to bid soon.

SC Dept. Education has a contract with the state
prison system. Buys pre-cure retreads

New Tires – Multi-award with BFS, Conti-Gen,
Goodyear and Michelin



Conclusions – Others States' Practices (cont.)

Virginia

- No state retread contract

- VDOT has its own non-mandatory use contract-mold-cure and pre-cure (only GY BFS and Michelin casings allowed)

- Multi-award new tire contract. BFS, Goodyear, Conti-Gen and Michelin. Michelin also provided retread pricing with its new-tire submission

- School districts contacted had their own, local or “consortium” contracts in place



Conclusions – Ongoing Evaluation

Dedicate a percentage of wheel positions for testing and product comparison

- ▶ The best place for evaluating tires (long term) is in real-world applications
- ▶ Can provide contemporaneous tire and retread performance insight for the fleets and the State, going forward



QUESTIONS?

